

comprising a merged collector region and being sufficiently thin and having impurity concentration controlled therethrough such that said merged collector region operatively functions simultaneously as an active collector region of a bipolar junction transistor and as channel regions of an intervening and an intrinsic junction field-effect transistors; said channel regions being further characterized by said intervening field-effect transistor channel region comprising at least that portion of said collector region located directly below said emitter region and defined by a control number (N2) of greater than  $10^{11}\text{cm}^{-2}$ , and said intrinsic field-effect transistor channel region comprising the remaining portion of said merged collector region that is located below said base region but outside of said intervening field effect transistor channel region

and defined by a control number (N3) lying in the range of about  $10^{11}\text{cm}^{-2}$  to  $2 \times 10^{12}\text{cm}^{-2}$ ;

- (b) means adjacent said effective lower collector boundary of said collector region comprising an air-insulation layer and having a transverse extent at least that of said base region for preventing majority carrier current flow across said effective lower collector boundary when said device is operatively biased;
- (c) means for increasing the current carrying capability of the semiconductor device, comprising means for increasing the current carrying capability of said intervening field-effect transistor channel region thereby neutralizing its otherwise parasitic current limiting effect on the operation of the semiconductor device; and
- (d) means for maintaining said air-insulation layer below said effective lower collector boundary upon bonding of said semiconductor body to a foreign body.

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